F·A·A·M facility for airborne atmospheric measurements

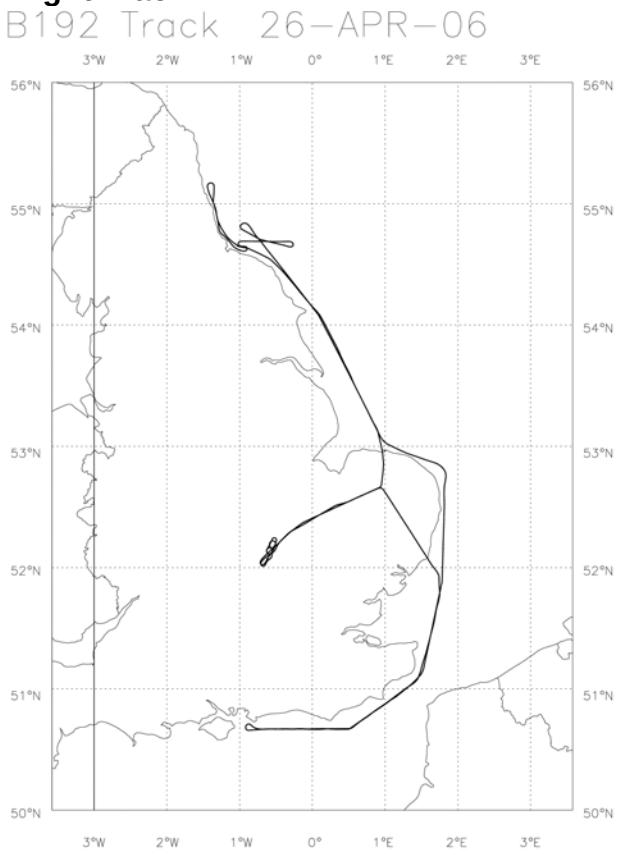
FLIGHT FOLDER

Flight No.:	B192
Date:	26 Apr 2006
Take Off	10:01:16
Landing:	14:56:33
Flight Time	4h55m17

Campaign: VISURB
Trials Instructions:
Operating Area: North Sea

POB	Position	Name	Institute
1	Captain	Alan Roberts	Directflight
2	Co-pilot	Ian Ramsay-Rae	Directflight
3	CCM	Gaynor Ottaway	Directflight
4	Mission Scientist 1	Ben Johnson	Met Office
5	Flight Manager	Maureen Smith	FAAM
6	Cloud physics	Martyn Pickering	Met Office
7	Wet Neph / PSAP	Simon Osborne	Met Office
8	Wet Neph / PSAP Training	Andy Wilson	Met Office
9	Core Chem / CCM2	Doug Anderson	FAAM
10	AMS	Gerard Capes	Manchester University
11	IR Camera	Joss Kent	Met Office
12	Mission Scientist 2	Clare Lee	Met Office
13	MARSS / ARIES	James Bowles	Met Office
14			
15			
16			
17			
18			

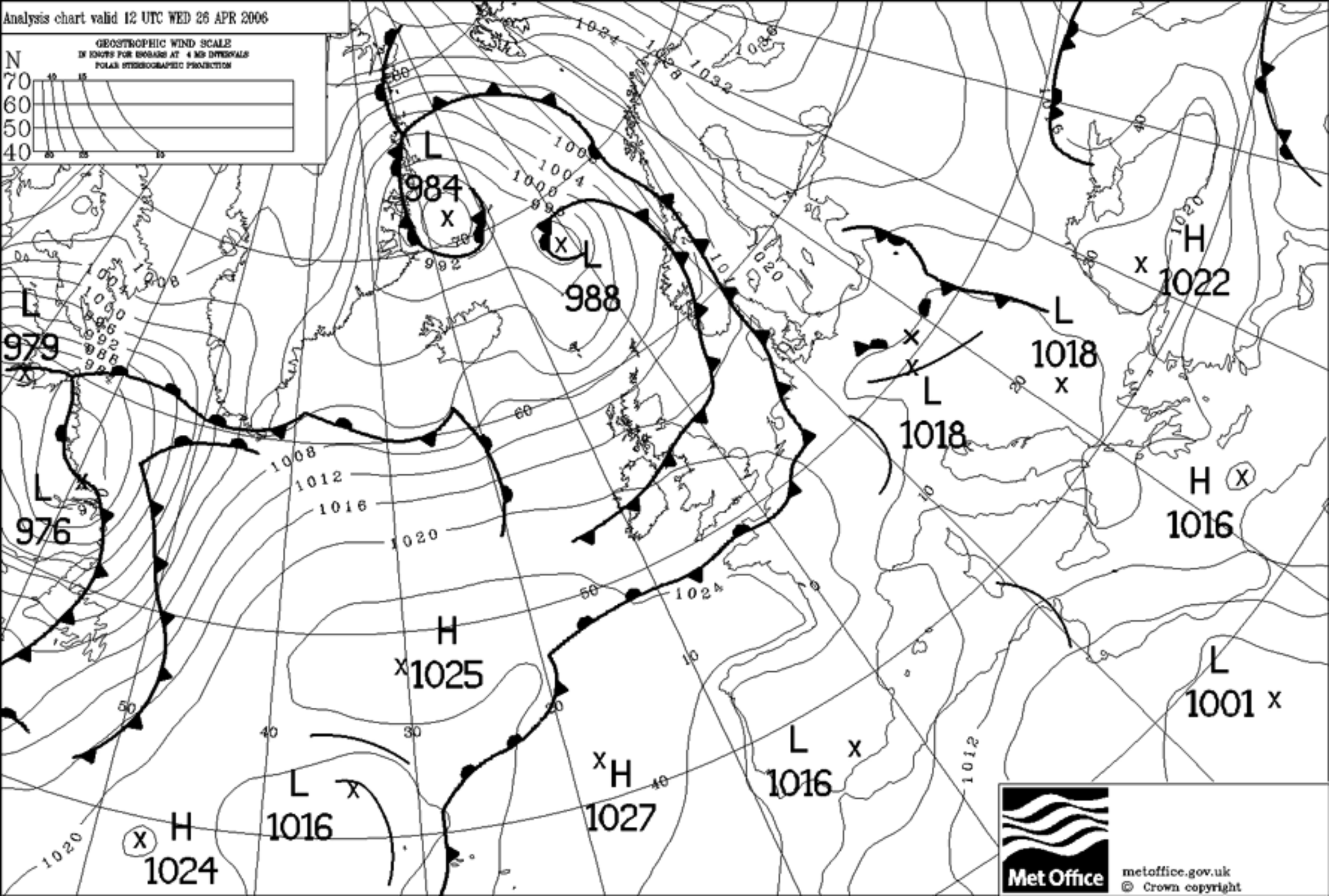
Flight Track:



FLIGHT SUMMARY

Flight No b192
Date: 26 Apr 2006
Project: VISURB
Location: North Sea

Start Time	End Time	Event	Height (s)	Hdg	Comments
090242		Start-Up	0.16 kft	128	52'04.36N, 0'37.48W
094000		INU	0.16 kft	128	Set to Navigate
100116		T/O	0.66 kft	214	Cranfield
100638		Video	8.4 kft	043	Start FFC & UFC
101943	102035	Profile 1	11.1 - 10.5 kft	001	
102044	102554	Profile 1	10.6 - 4.9 kft	003	1000fpm
102555	103352	Profile 1	4.9 - 0.35 kft	342	500fpm to 500'
103353	105117	Run 1	0.35 - 0.36 kft	334	500', Q1017
105117	105416	Profile 2.1	0.36 - 1.9 kft	317	500' - 2k'
105416	105802	Profile 2.2	1.9 - 0.38 kft	312	2k' - 500'
105802	111006	Run 1.2	0.42 - 0.41 kft	293	500'
111140	112220	Run 1.3	0.42 - 0.37 kft	182	500'
113302	113950	Profile 3	0.40 - 4.3 kft	281	500'-4.5k' 500fpm
113930		Video	4.0 kft	297	Change tapes
115731	120110	Profile 4	4.3 - 0.93 kft	153	1000fpm to 1k'
120111	122329	Run 2	0.93 - 0.91 kft	157	WP87 to WP40
122349	124036	Run 2	0.90 - 0.92 kft	125	WP40 to WP41
124050	130924	Run 2	0.92 kft	193	WP41 to WP42
130924	131103	Profile 5	0.92 - 0.03 kft	272	1k' - 250'
131103	131805	Profile 6	0.03 - 4.8 kft	268	250' - 5k'
131209		Video	0.67 kft	269	Change tapes
131806	132135	Profile 7	4.9 - 2.9 kft	272	5k' - 3k'
132458	132920	Profile 7	2.9 - 0.29 kft	092	3k'-500', Q1020
132920	133810	Run 3	0.29 - 0.30 kft	090	500', to WP43
133821	140347	Run 3	0.31 - 0.28 kft	052	500' WP43-42-41
140347	141116	Profile 8	0.28 - 5.7 kft	357	500fpm
141125	141528	Profile 8	5.8 - 10.0 kft	325	1000fpm
					NEON
143631		Video	5.0 kft	239	Swap UFC to DFC
143804		Event	5.0 kft	225	Abeam runway
144011		Event	5.0 kft	046	Abeam runway
145633		Land	0.15 kft	317	Cranfield
150119		Shutdown	0.14 kft	309	52'04.36N, 0'37.50W


Analysis chart valid 12 UTC WED 26 APR 2006
GEOSTROPHIC WIND SCALE
IN KNOTS FOR ISOBARS AT 4 MB INTERVALS
POLAR STEREOGRAPHIC PROJECTION
N
70
60
50
40
L
984
L
988
L
979
L
976
H
1025
H
1027
H
1024
L
1016
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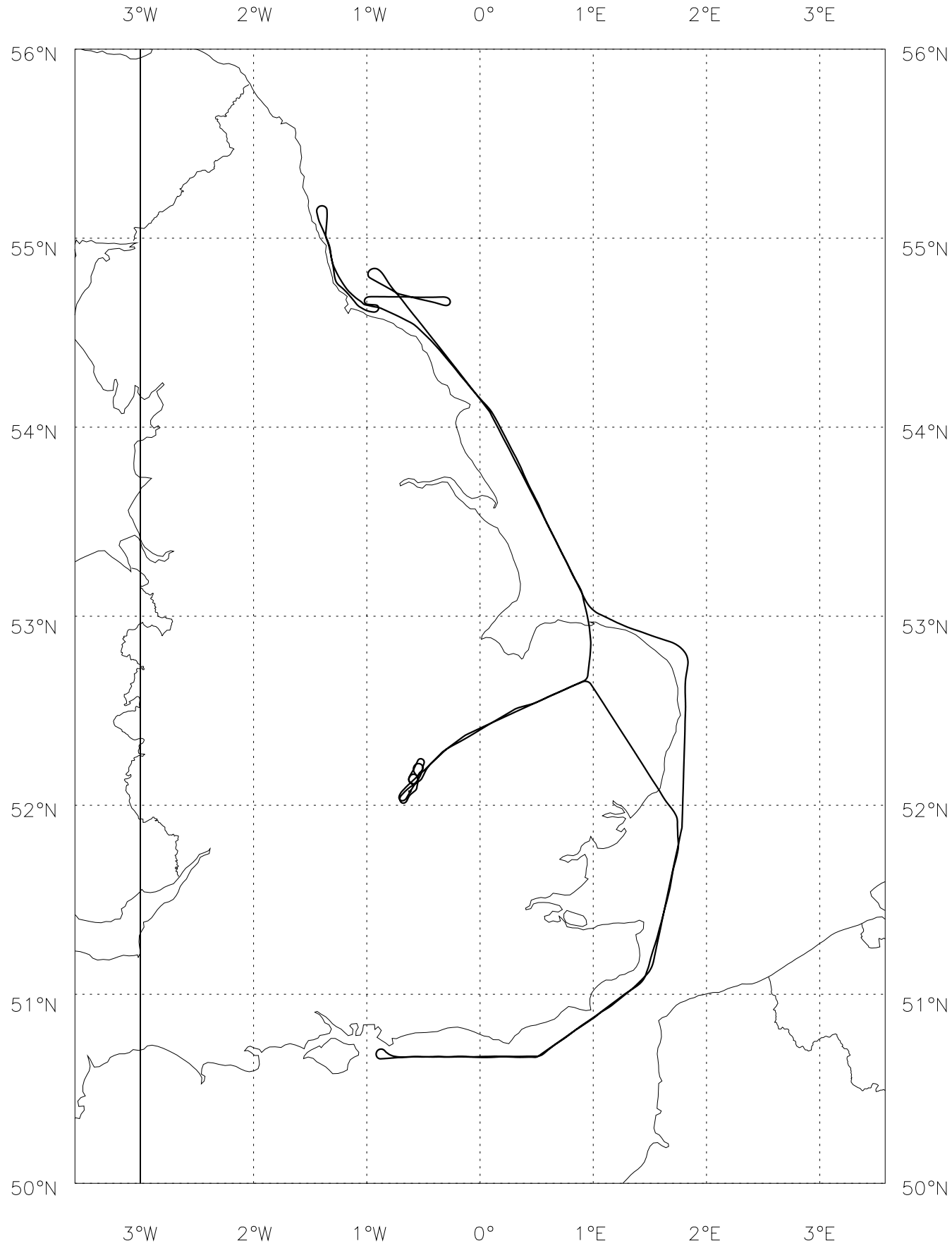
B192 Track 26-APR-06



FAAM Sortie Brief

VISURB-UK: Assessment of aerosol properties related to urban visibility

Flight No: B192 Date: 26th April 2006

Trial objectives:
To carry out in-situ sampling of aerosol properties and their effect on radiation.

Location:
Over ocean areas downwind of major pollution sources. Preferred : North Sea from Newcastle to AMPEP point 42.

Weather:
High loadings of atmospheric aerosols. Cloudless skies preferred, but not essential. No cirrus is required for BBR measurements.

Special requirements:
Check the mesoscale model forecast for the position of aerosol plumes before flying.

Instruments of particular importance:
Nephelometer/Wet-nephelometer
AMS
PCASP
PSAP
BBRs

B192 26th April 2006

Time	Manoeuvre	Time mins
1000Z	Take Off Cranfield and transit to a point just offshore of the Fenns and perform a profile descent at 1000ft/minute to 500ft.	20
1020Z	Perform a SLR at 500ft heading northwards up the coast until a significant aerosol plume/pollution is detected. Make a full transect crossing of the plume.	35
1055Z	Once the plume has been crossed, descend to 250ft and perform a SLR on reciprocal heading in a southerly direction making a full transect across the plume.	20
1115Z	Once the plume has been crossed, perform a broken profile ascent from surface within plume to map the vertical extent.	10
1125Z	Repeat crossing of plume at various different altitudes, decided by mission scientist.	60
1225Z	Profile down to 500ft in Southerly direction.	5
1230Z	Perform a SLR at 500ft heading Southwards on an AMPEP route towards point 42, until crossed through London plume.	70
1340Z	Once the plume has been crossed, perform a broken profile ascent from surface within plume to map the vertical extent.	10
1350Z	Profile descent to level decided by mission scientist and perform SLR.	25
1415Z	Profile and perform a SLR at 1000ft heading northwards on AMPEP route to point 87.	35
1450Z	Transit back to Cranfield arriving at 5000ft at a 20 degree angle to the runway 1.1 nm to the right of the runway.	20
1510Z	Perform a straight and level run at 5000ft for 2 mins.	2
1512Z	Turn to left for reciprocal run but displaced 1.1 nm right of the runway.	2
1514Z	Perform a straight and level run at 5000ft for 2 mins and manoeuvre for approach landing.	4
1518Z	Land at Cranfield.	

Debrief for Flight B192 on 26th April 2006

Sortie Objective: Insitu sampling of urban pollution from UK cities. BBRs may capture direct effect of aerosol layer if skies are clear above.

Weather: High pressure ridge over UK with light west or northwest winds. Variable amounts of stratocumulus cloud over the UK with bases around 3500ft and tops at around 4500ft.

Operating region: Close to the coastline from 55N in the North Sea round to the Isle of Wight in the English Channel.

Flight patterns:

Subsequent to take off from Cranfield a transit was made to the Fenns (AMPEP point 39) at FL110. A profile descent was made down to 500ft at AMPEP point 87 in the North Sea just off the coast from Norfolk. A route was followed northwest running roughly parallel to the east coast of England and between 5 and 20 miles from the coast as far as 55N (just beyond Teeside). A weak to moderate amount of pollution and aerosol was observed for a 50 mile stretch whilst passing west of Hull. Nephelometer scattering was around 80 x 10-6 m-1 and pcasp concentration was around 600 cc-1. Winds were around 15Kts from the west suggesting that the aerosol may have originated from local sources in the Hull and Scunthorpe area and from sources 100 miles upwind around Manchester and Leeds. Levels of aerosol and chemical species associated with pollution fell further north. A profile ascent was made to 2000ft followed by a descent back to 500ft. This revealed that aerosol levels were uniformly low in that altitude range.
Whilst passing Teeside the aircraft moved to just a few miles off the coast. Winds measured by the aircraft were 5-10m-s from the west, suggesting that a plume of urban pollution from Teeside would be advecting out over the North Sea. However, visual observations suggested that smoke from chimneys appeared to be advecting southeast down the coast rather than out over the sea. A few spikes of CO levels (up to 350 ppbv) and levels of other pollutants were recorded accompanied by moderate peaks in nephelometer scattering (up to 100 x 10-6 m-1, against a background of 30-40 x 10-6 m-1). A reciprocal turn was made to pass along past Teeside. As aerosol and pollution levels rose alongside Teeside, a turn was made onto an eastward heading. However, aerosol and pollution levels dropped as the turn was made and did not rise whilst travelling away from the coast. Approximately 50 miles from the coast a reciprocal turn was made followed by a profile ascent to 4500ft. Aerosol levels were fairly low throughout the profile so a turn was made to head back down the coast towards Hull.
A profile descent was made to 1000ft a long run was made along the coast all the way down the coast and through the Dover Straits into the English Channel. Dispersed pollution/aerosol was recorded past Hull and then whilst travelling past Essex and Kent which was assumed to from London area. Aerosol and pollution was also strong whilst passing Sussex. Here the winds were more northerly suggesting the pollution was from the southeast region.
A profile ascent to 5000ft and descent back to 500ft was made which showed the aerosol to be well mixed up to the BL top (4500ft). A reciprocal turn was made at

AMPEP point 44 to head back along the South coast and a long run was made at 500ft back to AMPEP point 41. At point 41 a profile ascent was made to FL100 to transit back to Cranfield. A NEON ‘paper clip’ pattern was carried out over Cranfield runway at 5000ft (4700ft AGL). There was 7/8 of stratocumulus just below (3500-4500ft) so the cameras were not able to view the runway; however it was useful and successful exercise because the ‘paper clip’ flight pattern had not previously been used at Cranfield.

Summary: A successful flight for insitu sampling of urban and industrial pollution and associated aerosols.

Problems: PCASP some channel 1 noise.

Ben Johnson

Aircraft Scientist's Log

Flight No **B**.192 Date 26/04/06 Name Ben Johnson Page 1 of 3

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
110048					Cloud base 3000ft Cloud top 4500 - 5000ft
					Stratocumulus 7/8 and cu
					light winds
1109		FL110	60		Transitting to operating area Scattered cirrus
101943	start P1	H10 - FL050			Heading O towards Point 87
102035	Interrupt	FL 105	O		
102044	Resume	FL 105			
102400		FL070			Crossed coast into N Sea
102500		FL060			unturretted Sc 7/8
					Cloud ~~top~~ base at 4,500ft ~~Cloud base~~ at 4,200ft
1032		1000ft	330		~~Stratus~~ Sc cleared
	end P1 & Start R1	-		Just North of Norfolk coast	Now halfway from 87 to 80
103353		500ft	334		Mostly clear, scattered Sc
1032-37		500ft	330		(Lat 53) Nox high values
					Pollution from Hull & Scunthorpe
104430	R2	500ft	320		Point 80
					Wind 260 8 m s^{-1}
105117 - 105802			IP2 (1 & 2.2)		Saw tooth 500-2kft. Doesn't reveal anything.
					~~1550~~ Very high spikes
~~105802 R1.2 5500ft NW~~					of CO for very
continuing					short periods
					Going past Teeside
				Concentrations were fairly uniform	
				with	height.

Aircraft Scientist's Log

Flight No **B**.192 Date 26/04/06 Name Ben Johnson Page 2 of 3

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
105829	R1.2				Resume Run North towards Newcastle at 500ft
11:11:40	R1.3				Turn back towards Teeside then turn onto Eastward heading to follow a plume but lost it.
113302	P3	500-4500 W		Just off Teeside	
Turned back westward after 10 mins and profile up to 4,500ft Didn't see any more aerosol so headed South and had a comfort break. Profile back to 1000ft					
Encountered moderate to weak pollution and aerosol neph ~ 70, CO ~ 170 past Hull Scunthorpe and down towards Norfolk Winds West at Teeside, NW at Norfolk					
~~R2~~					variable amounts of
120111	R2	1000ft	S-SE		SC 4000-5000ft
					No white capping or evidence of sea salt for any of the flight
1230		1000ft	S		Starting to pick up elevated aerosol and CO. Probably old dispersed pollution from London & SE region, neph ~ 70
1245				aerosol	clearing slowly.
130924	P5	1000ft-250ft			More pollution around 43
131103	P6	250ft-500ft			Heading towards Isle of Wight
1	P7	5000ft-500ft			Cloud at 4000ft 500ft thick

P3 ended at 11:39:50 4,500ft – 1000ft
P4 start at 11:57:31

Aircraft Scientist's Log

Flight No **B**.192 Date 26/04/06 Name Ben Johnson Page 3 of 5

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
132458	P7	3000ft-500ft			Aerosol seems uniform with height
132920	R3	500ft	270		Seeing some aerosol around Brighton neph ~ 100 PCAP ~ 600 CO ~ 150 CNC ~ 6000
1350		500ft 1000ft	N		Winds 10 kts 340° reported from Manston. Aircraft show winds light & variable direction
1400		500ft 1000ft	N		Due E of London
					PCAP ~ 600, weakly elevated pollution, neph ~ 70
140347	End R3	500ft 1000ft	N		Point 41
140347	P8	500 - 500ft	NW		Heading back to Cranfield with profile climb
					8/8 Stratocumulus
					cloud base 4000ft, top 5300ft
141100					Cleared BL, increasing rate of ascent to 1000ft/min.
141600		FL100			Transit to Cranfield at FL100
143000		FL100			Descent to FL050 to start
					Neon 'paper clip pattern'
143500		FL050			Thick SC 8/8 just below probably at 4500ft
143800		FL050			passing past runway but cannot see it due to cloud below only a few gaps in cloud
144500					cloud top was 4800ft
					cloud base 3500ft

Mission Scientist's Log

Flight No **B**192 Date 26/4/06 Name CLARE / LEE (MS 2) age 1 of 6

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
100047			212	52.0N 0.36W	Take Off. (1100L) Cranfield.
		FL110	065		Transit. - 8/8 St Cu, 1/8 Ci
101943	P1	FL110		52°42.0'N 0°54.0'E	Profile descent
102035		FL105			Brief profile interupt
102044		FL105			due to air traffic.
102558		5000ft.			changing to 500ft 1min
		4700ft.			in St Cu.
102740		4100ft.			Clear of cloud, but some
					below still.
103030		2300ft.	215	53°16'N 0°36'E	CO increasing
					~~Many Stratocu~~ Thin low cloud
103353	P1end	500ft.			
103353	R1.1	500ft.	333		wind: 6ms⁻¹ 1280°
					O3: 522 ppb.
					neph ~ 500 /cc
103918					Clear sky / thin cloud above - variable
					1032 → 1037 NOx peak.
104100			330		2D drop back to 260
					NOx back to normal
					Winds 6ms⁻¹ / 275°
104225		500ft.		53°N 54.0' 0°6.0'E	6/8ths above. - very variable.
					Sea: some white capping
105117	R1end	500ft.		54°18'N 0°18'W	CO const. ~ 140 ppb.
	P2.1				Saw tooth profile to check
					not missing any aerosol above.
					wind 7ms⁻¹ 1267°

Mission Scientist's Log

Flight No **B**192 Date 26/4/06 Name CLARE ;; LEE age 2 of 6

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
105416	P2.1 end	2000ft.	310	54°30' 0°30'W	patchy Cu above.
	P2.2↓				CO small increase – corresponding to chimney stack.
105802	P2.2 end	500ft			
	R1.2				wind: 10ms⁻¹ 267°
105911		500ft.	278	54°36.0'N 0°54.0W	Increase in CO + refl. 2D → 220 max.
					→ power stations ahead. 2357mb max.
110021					Turn to right to avoid coast.
110038					Straight again.
110420					2D – slow big jump for small (secs) time
					7/8 thin Sc above @ ~2000ft.
110735				54°54 N 1°18 W	Chem slowly increasing
					– barely significant. Tyne side plume not seen.
111006	R1.2	500ft.		55°6' N 1°24 W	2D increased slightly + tiny
					bit rain. • Turning right.
					CO doing cal.
111140	R1.3	500ft.	186		Winds 12ms⁻¹ 267°
111759					Passing fire on Leathland.
					– no significant increases.
					CO ~ ↑ 20ppb.
122136					CO ↑↑ 1250ppb.
112220	R1.3 end	500ft.			Turning left ⇒ back to plume.
			273		Heading N to plume.
112622					Right turn to pick up plume
					heading to East.
					Having difficulty finding plume again.

Mission Scientist's Log

Flight No **B**.192..... Date 26/4/06..... Name CLARE;;LEE..... age 3 of 6

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
113138		500ft.	East	54°36N 0°12W	CO increasing.
					Turning right back to coast.
113302	P3↑	500ft.	283		CO increasing for start time
113402					CO back to 120ppb (background).
113733					Heading to cloud layer
					increasing rate ascent +
					gentle course correction to
					avoid cloud layers.
113950	P3end.	~~FL~~ 43			Turn right, back to S.
	P4				Profile up to 4300ft for
		4300ft.			comfort break - can't
					go to 5000ft. due to danger area.
					CO fluctuating as going
					in/out boundary layer +
					cloud.
115731	P4↓	4400ft.			Profile descent at 1000ft/min
					to 1000ft.
120111	P4end	1000ft.	157		Wind 9ms⁻¹ 283°
	R2				CO cal.
120450					AMS seeing small peaks.
					General increase in CO to 130ppb.
					NOx 1→10ppb.
120800					Sky CO increase + fluctuating
					slightly. ~180ppb+

Mission Scientist's Log

Flight No **B** 192 Date 26/4/06 Name CLARE LEE age 4 of .....

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
121759					Over past few mins increase in AMS Sulphate
					CO level ~150ppb.
					Winds 9ms^{-1} 128°
122143					Vetreph humidigraphs → 60→65 humidity
122400				52°42'N 1°48'E	CO + NOxetc. recording lowest level Pollution as seen in July. CO = 138ppb
[illegible]				~ waypoint 40.	Wind 9ms^{-1} 316°
					~ 7/8 → 8/8 Stw overhead.
123006			180°	52°24'N 1°48'E	v. small increase in CO. ~168ppb.
123122					CO 156ppb.
					wind 5ms^{-1} 339°
124000					Passing point 41
124300					AMS nitrate ↑ 5→6 μm/cm^3 for 2 mins.
					No other insts. seeing anything.
121517					Turbulence. Turbulence
125528					Cons. very low
					winds 2ms^{-1} 126°
130100					Stw increases again. → dispersed pollution from London.
					wind 4 ms^{+1} 266° (still light)
130924	Read. PS ↓	1000ft.			Profile descent + ascent to see boundaries of pollution in altitude + determine highest conc.

Mission Scientist's Log

Flight No **B**192 Date 26/4/06 Name CLARE LEE age 5 of 6

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
131103	P5	250ft.			
	P6 ↑	250ft.	269	50°36' N 0°0 E	wind 3ms⁻¹ /288°
131715					Going through cloud. CO drops, reph ↑
131806	P6end	~~5000~~ ~~4800~~ft.	272		
	P7 ↓				
131900		4300ft.			In cloud again
132135	P7int.	3000ft.			Intending to turn around. Seeing small peaks on turning (Clear above.)
132458	P7rec.	3000ft.	091	50°36' N 0°54'W	
132928	P7end	500ft.	091		
	R3	500ft.			CO cal.
					6/8 ~~Cu~~, some v. thin.
133354		500ft.	057	50°36'N 0°12'E	CO ~150ppb.
					winds 5ms⁻¹ /257°
					2D ~600 no big variability
					layers below much less than N. Sea
					v. few white tops.
133730					At point 43
133946					Drop in CO to ~140 ppb. for few mins
					Sudden
1340					Drop to ~130ppb.
					Then const. (small variability)
					clear above.
1345					CO increase to ~148 ppb
					wind 7ms⁻¹ /219°

Mission Scientist's Log

Flight No **B** 192 Date 26/4/06 Name CLARE; LEE age 6 of 6

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
* Takeoff 134925		500ft.	014	51°6'N 1°24E	(O increase T17 ppb + NO x T for few mins
					wind 4ms⁻¹ /161°
					~1/8 Lo v. patchy above.
					Sea: waves not large at all
140347	P3end		358	51°48' N 1°42' E	End at point 41
	P8↑	500ft.			Profile climb @ 500ft/min
					towards pt. 39
140427		4200ft.			Going through cloud
141056					clear of cloud
					through BL increasing rate
					ascent to 1000ft/min
141528	P8end	FL100			Transit towards Cranfield.
143330		5000ft.	229		Heading towards Cranfield
					for NOy speedup
					manoeuvre.
		5000ft.			First run too cloudy to see
143849					Turning left. (hard).
143908		5000ft.			2nd run past. - too cloudy.
					no ARIES data taken
					end science, no point
					in characterising runway T.
					Circuits + slow descent due to traffic.
1456					Landing Cranfield.

CORE CHEMISTRY FLIGHT LOG FOR FLIGHT FOLDER

Flight Number : B192
Date : 26/4/06
Operator and contact info :Doug Anderson dougan@faam.ac.uk

Problems with Instruments

CO	**CO lamp not switched on until 094000UT**
O_3	**none**
NO_x	**None**
SO_2	**N/A**
TDLAS	**None**
WAS	**N/A**

CLOUD PHYSICS LOG Flight B 192

Date: 26/04/06	Operator: MAP	DRS Time: 07:47:00	DAU1 Time: +0	DAU2 Time: +0	DAU3 Time: +0	Aux1 Time: +0	Aux2 Time: +0	Page 1 of 1

G.M.T	PCASP		FFSSP	SID1	SID2	2D2-C		2D2-P		CIP25			CIP100			Habit	Remarks
	Conc/cc	Mean R	Block TX	Count	Count	Conc/L	Max size	Conc/m3	Max size	Conc m3	Max size	LWC	Conc m3	Max size	LWC		
10:19:43	35	0.09	152	5													Start Profile 1 from FL110
10:21:30	100	0.09		5													FL100
10:22:16	100	0.09		5													FL090
10:23:10	115	0.10		5													FL080
10:24:07	145	0.09		5													FL070
10:24:58	160	0.09		5													FL060
10:26:01	140	0.09		5													FL050
10:27:32	270	0.09	166	70													FL040
10:29:05	370	0.09		20													FL030
10:30:48	470	0.09		20													FL020
10:32:39	720	0.09		20													FL010
10:33:55	560	0.09		30													End of Profile 1 & Start Run 1.1 @ 500’
10:34:00	520	0.09		20													
10:36:00	500	0.09		20													
10:38:00	700	0.08		20													Noise?
10:40:00	260	0.09		20													
10:42:00	240	0.09		15													
10:44:00	270	0.08	167	20													
10:46:00	285	0.08		20													
10:48:00	290	0.09		20													
10:50:00	270	0.09		20													
10:51:26	280	0.08		20													End of Run 1.1 & Start Profile 2.1 from 500’
10:52:29	170	0.09		10													FL010
10:54:16	250	0.09		15													End of P 2.1 & Start Profile 2.2 from 2000’
10:56:21	250	0.09		15													FL010
10:58:01	240	0.08		10													End of Profile 2.2 & Start Run 1.2 @ 500’
10:59:00	200	0.08		10													
11:01:00	220	0.08		10													
11:03:00	300	0.09		10													
11:05:00	200	0.08		10													
11:07:00	240	0.09		10													
11:09:00	290	0.08		10													
11:10:06																	End of Run 1.2
11:11:42																	Start Run 1.3 @ 500’
11:12:00	Noise		170	20													Noise in CH1
11:14:00	Noise			10													
11:16:00	Noise			15													
11:18:00	260	0.09		15													
11:20:00	230	0.08		10													
11:22:00	1000	0.09		10													
11:22:24																	End of Run 1.3
11:33:02	200	0.09															Start Profile 3 from 500’
11:34:06	165	0.08		15													FL010
11:35:52	160	0.09	171	20													FL020
11:38:00	260	0.08		20													FL030
11:39:59	240	0.12		20													End of Profile 3 @ 4200’

CLOUD PHYSICS LOG Flight B 192

Date: 26/04/06	Operator: MAP	DRS Time: 07:47:00	DAU1 Time: +0	DAU2 Time: +0	DAU3 Time: +0	Aux1 Time: +0	Aux2 Time: +0	Page 2 of 2

G.M.T	PCASP		FFSSP	SID1	SID2	2D2-C		2D2-P		CIP25			CIP100			Habit	Remarks
	Conc/cc	Mean R	Block TX	Count	Count	Conc/L	Max size	Conc/m3	Max size	Conc m3	Max size	LWC	Conc m3	Max size	LWC		
11:57:35	115	0.08	474	5													Start Profile 4 from 4200’
11:58:55	375	0.09		10													FL030
11:59:54	350	0.08		10													FL020
12:01:08	445	0.08		15													End of Profile 4 & Start Run 2 @ 1000’
12:02:00	450	0.08		15													
12:04:00	515	0.08		15													
12:06:00	600	0.08		20													
12:08:00	700	0.09		20													
12:10:00	770	0.09		20													
12:12:00	710	0.09		15													
12:14:00	790	0.09		20													
12:16:00	625	0.10		20													
12:18:00	620	0.10		30													
12:20:00	560	0.10		20													
12:22:00	510	0.10		20													
12:24:00	270	0.08	475	15													
12:26:00	270	0.08		15													
12:28:00	300	0.08		15													
12:30:00	395	0.09		15													
12:32:00	600	0.09		20													
12:34:00	550	0.10		20													
12:36:00	585	0.10		20													
12:38:00	675	0.10		20													
12:40:00	700	0.10		20													
12:42:00	Noise		476	20													
12:44:00	Noise			20													
12:46:00	Noise			15													
12:48:00	Noise			15													
12:50:00	Noise			15													
12:52:00	Noise			10													
12:54:00	Noise			10													
12:56:00	550	0.09		10													
12:58:00	350	0.10		10													
13:00:00	500	0.10		10													
13:02:00	580	0.10		10													
13:04:00	560	0.10		10													
13:06:00	630	0.10		10													
13:08:00	660	0.10		10													
13:09:32																	End of Run 2 & Start Profile 5
13:11:04	750	0.10		40													End of Profile 5 & Start Profile 6 from 250’
13:12:43	530	0.09		20													FL010
13:14:25	580	0.09	477	20													FL020
13:15:54	550	0.09		80													FL030
13:17:07	750	0.09	503	1000		3											FL040
13:18:04	100	0.09		5													End of Profile 6 & Start Profile 7 @ FL050
13:19:33	645	0.12	626	2000		7	25									12	FL040

CLOUD PHYSICS LOG Flight B 192

Date: 26/04/06	Operator: MAP	DRS Time: 07:47:00	DAU1 Time: +0	DAU2 Time: +0	DAU3 Time: +0	Aux1 Time: +0	Aux2 Time: +0	Page 3 of 3

G.M.T	PCASP		FFSSP	SID1	SID2	2D2-C		2D2-P		CIP25			CIP100			Habit	Remarks
	Conc/cc	Mean R	Block TX	Count	Count	Conc/L	Max size	Conc/m3	Max size	Conc m3	Max size	LWC	Conc m3	Max size	LWC		
13:21:33	560	0.09	627	30													FL030
13:26:18	800	0.10	628	30													FL020
13:28:18	800	0.10		20													FL010
13:29:21	890	0.09		30													End of Profile 7 & Start Run 3 @ 500’
13:30:00	750	0.10		30													
13:32:00	700	0.10		30													
13:34:00	600	0.10		30													
13:36:00	590	0.10		30													
13:38:00	Noise			10													
13:40:00	795	0.11	629	5													
13:42:00	480	0.10		10													
13:44:00	490	0.10		10													
13:46:00	540	0.10		10													
13:48:00	500	0.10		10													
13:50:00	520	0.09		10													
13:52:00	500	0.09		30													
13:54:00	660	0.10		20													
13:56:00	560	0.10		30													
13:58:00	580	0.10		30													
14:00:00	610	0.10		20													
14:02:00	590	0.10	630	20													
14:03:48	680	0.10		20													End of Run 3 & Start Profile 8 from 500’
14:05:13	630	0.10		20													FL010
14:06:28	550	0.10		40													FL020
14:07:46	490	0.09		40													FL030
14:09:13	600	0.09	631	100													FL040
14:10:34	470	0.14	989	2000		5	25									12	FL050 FFSSP FIFO’s swamped to reset
111:40	90	0.09		10													FL060
14:12:46	Noise			10													FL070
14:13:41	Noise			10													FL080
14:14:30	20	0.09		5													FL090
14:15:29	35	0.10		5													End of Profile 8 @ FL100
	PCASP noisy on occasions, flowrate = 1CC/sec FFSSP reset in cloud once due to particle rate exceeding fifo storage																

P.S.A.P. Log

Flight No. **B**.192..... Date .26/04/06..... Page ..1..... of ...

GMT	Filter Trans.	Flow Rate	B_a x 10^{-6}	Ph_det levels		Run	Remarks
Set to DRS time	New filter Tr = 1.000	Set to 3.0 lpm				Ave=30s	←Preflight
1012	1.0set	3.0	0.0	21	45	-	new filter
1125	0.937	2.94	1.2	19	44	30	check
1138							pump off for cloud
1143	0.924	2.90	0.0	19	45		pump on again
1150?							pump off for cloud
1155	0.922	2.91	1.4	19	45		pump on
1312	0.843	3.02	1.7	17	45	30	check
131550							pump off for cloud
132710	0.853	3.1	5.8	17	43	30	pump on
140940							filter removed
141100							psap off

LT 01392 884647

ARIES flight log

Flight: B192 | Location: North Sea. | page 1 of

Date: 26/04/06 | Operator(s): Jass) Kevin | Resolution: 1 | Gain A: 2 B: 4

Notes: UISURB Flight

DRS time	Flight ptrn	Filename	Shtr	HBB	CBB	Mir.	Det.	Win	Macro(s)	Comments
072509	START	FLIGHT RECORDING								
10:07:30	Laser	HBB to	68°C	to keep	signal in range without					changing gain
10:12:40	Set	CBB to	10°C	– it's	at 27°C	when set to	20°C.			
10:13	Speed	reverted to	60 scans/min.	have been	@ FL110	for some time.				
101640	Rebooted	systems to	see if scans	come back						
10:30	Reboot	worked	– yes:	is 2 cm⁻¹	or bigger.	Going	for 1 cm⁻¹	zero		
	speed	good to	60 scans/min	–	"unable to configure Michelson"					
	comes	up.								
10:49	Rebooted	PC, everything	now OK							
	Set up	MACRO	IR-Fast	for	a 9 second	data	@ 1 cm⁻¹.	worked		
	OK but	returning	to normal	scan	rate of	120 scans/min	then			
	old	Michelson	config	problem	re-occured.					
	Rebooted	PC, now	OK.							
1107	Restarted	flight	recording.							
112399		B192 @	Cld	71.0	23.2	18.1	-1999	26.2	CH1	short cal.
112526		B192 P	Cld.	71.0	22.9	18.3	" "	26.1	N1 x 2	
112742		B192 Q	Open	70.3	23.1	17.6	-1906	25.4	Z1 x 2.	
112949		B192 R	Cld.	71.1	24.8	18.1	" "	24.5	CH1	cal.

IR_Fast
1.
0.
1. 1xgroup
55 Angle.
200 Number of program
1 recorded
~ 9secs

ARIES flight log

Flight: B192 | Location: North Sea / English Channel | page 2 of 2

Date: 26/04/16 | Operator(s): Jess / Ken | Resolution: 1 | Gain A: 2 B: 2

Notes: · Neon test @ end of flight.

DRS time	Flight ptrn	Filename	Shtr	HBB	CBB	Mir.	Det.	Win	Macro(s)	Comments
14:40:22	IR cal	B192W	closed							
	" "	B192 X								

Wet Nephelometer Log

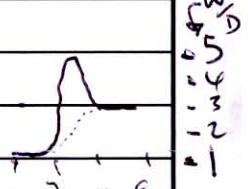
Flight No **B**.192..... Date ..26/04/06.... Operator's name: .WILSON/OSBURNE. Page 1 of 4

GMT	Run	Height	Sample flow	Dry neph RH	Wet neph RH	Temp ramp	T_{water}	Remarks
PRE-	FLIGHT	CHECKS.			TIMES			AV = 30sec, BLANK = 300sec, period = 300sec
		Wet neph →			0.1K.			
		Dry neph →			0.1K.			error?
		Labview:	W		1.15			RH1 = 42, RH2 = 60, RH3 = 39, RH5 = 69
								RH6 = 57.0
						→		with reverse = RH due to residual water, W seems fine
		with	water		→		5°C	RH5 ≈ 45%, RH1 = 35%
		"	"		→	↗	30°C	RH5 = 9%, RH6 = 69%
								Temp ramp working well. Errors were seen W = 1.1 → 1.5
101500								DATA ON. ALL OK. (@ 70%)
1018		climb.	10.4	6.3	51.5	↗	34°C	W ≈ 0.75. !!
	P1↓	R1100↓	11.6	6.7	65.5		35°C	keep temp cycling and during profile descent.
	P1↓	4000'	13.2	31%	67%	→	35°C	Increase in input RH.
102900	P1↓					↗	38°C	Set.
103130	P1↓			36	75			RH5 = 84.5%
103350	P1/R1	500'	14.8	39	76	↗	40°C	Set to end P1 / start R1
103850	R1	500'	15.0	39	81	↗	43°C	Set
104245	R1	"	14.9	39.3	87	↗	45°C	Set to max. RH5 = 90% T_{in} = 21.6°C
104510	"	"	14.9	39.3	91.4	↓	5°C	Ramp all the way down. RH1 = 28.8°C, RH3 = 23.2°C
								"GE" of 1.8 @ 90% RH

Wet Nephelometer Log

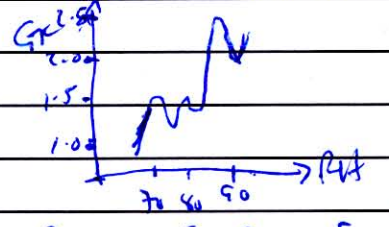
Flight No **B**192 Date 26/04/06 Operator's name: WILSON/OSBORNE Page 2 of 6

GMT	Run	Height	Sample flow	Dry neph RH	Wet neph RH	Temp ramp	T_{water}	Remarks
								RH= humidogram 'flat' @ 65→70 %.
10523			14.5			↗	45°C	Set to max. during sawtooth.
10000		500'	15.0	37.3	90.6	↓	5°C	set to min. for start RAMP DOWN
								GF 1.7 → 2.0 @ 90% RH
10700	R1.2	500'	14.4	42.5	56.6	⇗	30°C	(during at T_{w0} = 19°C) RAMP up.
11090						⇗	35°C	
11040	in turn	500'	14.8	44	82	↗	40°C	GF of 4.5 @ 75% definite peak
11315		500'	15.0	42.5	88	↗	45°C	Set to MAX T_{w20}
11626		500'	14.9	42.5	91.0	↓	5°C	RAMP Down to MIN T_{w20}
12335		500'	14.7	38.0	54.2	↗	45°C	Set to max temp. ready for plume search by-
13039		500'	14.8	37.6	90.3	↓	5°C	RAMP Down. CANCELLED FOR CLIMB.
11333	R2↗	500'↗	~~14.6~~ 14.5	35.6	71.3	↗	45°C	RAMP up FOR CLIMB.
11400						↓	43°C	RHS close to 100%.
11450		4200'	15.0	29.2	90.5	↓	40°C	down for safety.
12000	↓	↓						GF = 1.75 @ ~88% RH.
12015	R2.1	1000'	14.4	34.1	87.4	↗	45°C	take to MAX to start RAMP Down.
12040	R2.1	1000'	14.4	34.1	94.5	↓	5°C	Set to min for start RAMP Down. Fairly nice humidogram.
12150	"	1000'	14.5	35.7	50.6	↗	45°C	Set to MAX for RAMP up.
12232	"	"	15.5	35.0	86.6	↓	5°C	Set to MIN (previously dropped to 40°C to stop 100% RH)
12340	"	"	13.9	35.4	49.8	↗	43°C	~~Set~~ to 43°C



Wet Nephelometer Log

Flight No **B**.192..... Date ..26/04/04..... Operator's name: WILSON/OSBORNE..... Page 3 of 4

GMT	Run	Height	Sample flow	Dry neph RH	Wet neph RH	Temp ramp	T_{water}	Remarks
12363.	R2.1	1000'	15·3	40.9	86.8	→	43°C	RHS = 97·5% GF ~ 1.55 → 1·60 Steady, not as high as previously
124310		1000'	14·9			↓	5°C	set to MIN RAMP.
125005	"	1000'	14·8	40.9	93.5	↗	43°C	set to 43°C RAMP GF RHS = 98.9% at start of jumps in humidogram at ~65% and ~82% RHS = 96.8% GF ~ 1.75 steady reading at high RH
130015	"	"	14·7	47·4	91.2	→	43°C	
130340	"	"	14·8	48·4	92·8	↓	5°C	Set to MIN RAMP Down.
								
131135	R	250' ↗	14·9	45·5	56·4	↗	43°C	Strange!! plumes? Set to 43°C (not quite max temp)
131318								hit 100% RH on RHS → condensation/droplets? jump GF sensor → going from cloud (SEA) as well.
132940		500"	14·4	44·5	93·9	↘	5°C	set to min ramp.
134206		500"	14·3	51·3	54·2	↗	42°C	
134654			16·4	52·3	89·3			flow to 16·4 to avoid saturation water temp 42°C
1								RHS (pre wet neph) 98%.
135144		500	14·6	47·1	91	↘	5C	ramp to min. bit bumpy here.
140204		500"	14·4	44·2	56·8	↗	42°	

Wet Nephelometer Log

Flight No **B** 192 Date 26/04/06 Operator's name: WILSON / OSBORNE Page 4 of 4

GMT	Run	Height	Sample flow	Dry neph RH	Wet neph RH	Temp ramp	T_{water}	Remarks
140700		1500'	16.2	36.7	86.4			flow rate increase. RHS 96%
141400	→	~~FL80~~	13.5	5.0	83.7			STOP RECORDING. RH = 96%
								wet neph off. Drain water.

Microwave Radiometers FLIGHT LOG	Date	26/4/06	Flight	B192	log pages	2

Operator(s)	Bowles	Campaign	VISURB
Departure	Cranfield	Arrival	Cranfield

System start

MARSS

Visual pod inspection						X
Close 3 SSP circuit breakers						X
Close all MARSS circuit breakers						X
FERA on				at time	07:32	
Temperature controller initial temps	Ch16	17.1°C	Ch 17	17.1°C	Ch18	16.8°C
Temperature controller set points		54.0°C		58.0°C	-20	40.0°C
MARSS CPU on				at time	07:35	
Initial target temperatures	Hot	289.7		Cold	285.5	
Target heating						X
*** CHECK SCAN HEAD CLEAR ***						X
Scanning on (LMD box)				at time	07:45	
Scan indication		Monitor	X		Visual	X

Deimos

Close all Deimos circuit breakers						
Turn on Deimos CPU						
*** CHECK SCAN HEAD CLEAR ***						
Start Deimos Software				at time		
Initial target temperatures	Hot			Cold		
Target heating						X
Scan indication		Monitor			Visual	
Weather	Cloud			Precip		
	Surface			Pressure		
	Other					

System functionality check

(after initial system warmup, approx 1 hour)

PC to DRS Time error	$t_{PC}=t_{DRS}$ +	0	at time	08:30	
Brightness temps 'sensible'	Yes				
Target temps MARSS:	Hot	344.59	Cold	287.63	
Target temps Deimos:	Hot	NA	Cold	NA	

Channel gains 'sensible'	Ch1 A (-)	Ch3 A (-)	Ch1 B (-)	Ch3 B (-)	
	Ch16 (40-44)	Ch17 (45-49)	Ch18 (40-44)	Ch19 (40-44)	Ch20 (44-48)
	42.34	34.55	38.11	40.59	42.48

Power changeover

Headset on before start		
Listen to engine start sequence	4, 3, 2, 1.	
LMD off (3 switches, bottom to top)		
Exit Deimos Software (x)		
POWER CHANGEOVER		
LMD on (3 switches, top to bottom)	then pushbutton	
Restart Deimos Software		
System running again		at time

Flight #	B189	Date	08/04/06	Operator(s)	Pollard	log page	2	of	2

Time	Run id	Alt/FL	*Remarks*	Sys
08:26			CH16 OK!	
08:26			Time on MARSS pc toDRS	
10:05ish			Take off	
10:20:44			Decent to 500ft p1	
10:27			Through cloud	
10:33:53			Start run 1 500ft	
10:51:17			Sawtooth to 2000ft end of run1 p2	
10:58:??			Start run 1.2	
11:22:20			Run 1.3 end	
			All sorts of runs and profiles, plume chasing	
			Heading back to coastfrom sea	
11:57			P4 desent	
12:01:11			R2 1000ft	
13:09:24			P5 decent to 250ft end of R2	
13:11:03			P6 ascent to 5000ft	
13:?			P7 decent to 500ft	
13:21:35			P7 interupt @ 3000ft +turning starboard	
13:24:58			P7 continued.	
13:29:20			R3 start @ 500ft	
14:03:47			P8 ascent to FL80	
14:15:28			P8 end	
14:26:00			Ch16 –2K in zenith view??? Clear sky above clouds.	
15:03			All off	

IR Camera log.

B192 26/04/06 Joss Kerr

Pre flight Cal.

08:35:05	Temp = 17°C
08:36:05	17°C
08:37:05	17°C
08:38:05	18°C
09:00:52	Temp = 61°C.
09:01:52	61°C.
09:02:52	61°C.
09:03:52	62°C
09:04:52	62°C

Flight Part.

Cloudy!

Time

Hairpin manoeuver leg 1

leg 2.

Flight Manager's Instrument Status Log

Flight No. **B** 192 Date: 26th April 2006

Instrument	Operated	Instrument	Operated
Navigation		**Cloud Physics**	
INU	**Y**	**Probes**	
XR5M GPS	**Y**	FFSSP	**Y**
Cruciform GPS	**Y**	PCASP	**Y**
Satcom C	**Y**	2D-P	**Y**
Satcom H	**Y**	2D-C	Y
Thermometers		Cloudscope	**N**
De-Iced Temp	**Y**	SID 1	**Y**
Non De-Iced	**Y**	SID 2	**N**
Heimann	**Y**	HVPS	**N**
Hygrometers		CIP25	**N**
G. Eastern	**Y**	CIP100	**Y**
J. Williams	**Y**		
Nevzorov	**Y**		
TWC	**Y**		
FWVS	**N**	**Racks:**	
Radiometers		INC	**N**
Upper Clear	**Y**	CCN / CPC	**N**
" Red	**Y**	CVI	**N**
" Silicon	**Y**		
" SHIMS	**N**	**Aerosol**	
Lower Clear	Y	PSAP	**Y**
" Red	**Y**	Nephelometer	**Y**
" Silicon	**Y**	Filters	**N**
		AMS	**Y**
Large Radiometers			
TAFTS	**N**		
MARSS	**Y**		
DEIMOS	**N**	**Others:**	
ARIES	**Y**	NIR TDLAS	Y
SWS	N	2BT O3	N
Chemistry		VACC	N
Ozone	Y	PEROXIDE	N
SO2	N	Formaldehyde	N
NOX	Y	ADA	N
CO	Y	CPI	Y
ORAC	N	Noxy	N
PAN	N	PTRMS	N
PERCA	N	Bag Sampling	N
WAS	N	Tube Sampling	N

Faults / Incidents Log

Flight No. B192
Date: 26 April 2006

Instruments

1. Nevzorov – Cover windows and screws miissing for calibration constant selector panels for both TWC and LWC Control Units
2. Radar Altimeter – reading 0 on HORACE, 4094 on DRS between 5k' and 500',. Reset Port Aft DLU then okay.
3. FWVS started up okay on preflight. Sortie all at low level and dewpoint didn't go below –15°C so data all 0°C.
4. Flight Manager's pc locked up when updating Fltsumm, rebooted then okay.

Aircraft
Nil

Satcom Calls
Nil

MISSING LOG SHEETS:

The following log sheets are not available for flight B192:

Log	Reason
Cloud Physics Processing	Awaiting processing
IR Camera Processing log	
CPI	Log only of interest to instrument operator so no copy left with FAAM

VIDEO RECORDINGS:

3 x Forward Facing Cameras
3 xUpward Facing Cameras

Digital8 video recordings from this flight reside with :

Dr Jonathan P. Taylor

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